DISCUSSION DOCUMENT

PROPOSED SITE SELECTION PROCESS FOR THE DEVELOPMENT OF A HAZARDOUS WASTE MANAGEMENT SYSTEM

Manitoba Hazardous Waste Management Corporation

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ENVIRONMENTAL POLICY STATEMENT

The Manitoba Hazardous Waste Management Corporation is committed to the preservation and enhancement of environmental quality through the development of a hazardous waste management system for the Province. This undertaking is a fundamental element needed to achieve the broader objectives of universal environmental stewardship and sustainable economic development within Manitoba.

To reach these goals, the Corporation uses the following policy objectives as the basis for the performance of its work.

1. Minimize waste generation and maximize resource conservation through the promotion and facilitation of waste reduction, recycling, re-use and recovery at source.

2. Ensure that all activities involved with the handling, storage, treatment and disposal of waste and residue products are consistent with the protection of public health and environmental quality.

3. Earn public approval of the system and its components through open and responsive communication and through public participation in all aspects of their development and operation.

4. Encourage economic development through the provision of a cost-effective waste management system and the enhancement of environmentally based enterprises.

5. Foster and promote contemporary environmental values and policies through public education, and research as well as by example.

6. Assume, in perpetuity, the environmental stewardship of wastes and residues placed in the Corporation's custody.

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by:

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Management Corporation

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1.0 INTRODUCTION

The Manitoba Hazardous Waste Management Corporation (MHWMC) is a commercial Crown corporation mandated to develop a hazardous waste management system for the province. The MHWMC will act as the system proponent throughout the planning and development stages of the project.

A development strategy has been adopted by the MHWMC to proceed with system development on an incremental basis. Initially, system facilities will consist of a central collection and storage facility, and a series of regional transfer stations. Waste reduction, treatment and disposal technologies will be added to the central site as they are required and can be justified on a technical and economic basis. One of the key activities in the system development process is the identification, assessment and selection of sites for facilities required by the system.

This document initiates the site selection activity by proposing a process for the selection and evaluation of facility sites. A summary of site selection processes in other jurisdictions, in Canada and the United States, are included as background information. In addition, information on site selection criteria adopted in other jurisdictions is appended. These information sources, in conjunction with the recommendations arising from the Clean Environment Commission hearings on hazardous waste management in Manitoba, are the basis for the site selection process proposed by the Corporation.

This document is intended as a discussion focus to initiate the consultative process leading to facility siting. The proposed process represents a basic framework for the commencement of the siting initiative. Modifications to this basic process can be expected in response to stakeholder and public review throughout the site selection phase of project development.

2.0 THE PROPOSED MANITOBA HAZARDOUS WASTE MANAGEMENT SYSTEM

2.1 Background

The Province of Manitoba initiated development of a Hazardous and Special Waste Management Program in 1982 in response to increasing environmental awareness and concern regarding the appropriate collection, treatment and disposal of hazardous wastes in the province. The program was developed by the Hazardous Waste Management Section of Manitoba Environment and Workplace Safety and Health. A series of public and technical meetings and hearings were held by the Department and the Clean Environment Commission to solicit the input of the public and other interested stakeholders. These meetings and hearings established a public forum for the consideration of stakeholder input and concerns regarding the establishment of the provincial hazardous waste management system (Kennedy, 1982, ME&WSH, 1983, Yee et al. 1985, and CEC, 1987).

In November 1986, a commercial Crown corporation was established to act as the proponent of a Hazardous Waste Management System (The Manitoba Hazardous Waste Management Corporation Act, 1986). The Manitoba Hazardous Waste Management Corporation started operation in August 1987 and is currently proceeding with establishing the system's scope and testing its feasibility. A major activity in this work is that associated with facility siting.

2.2 System Objectives and Development

2.2.1 System Objectives

The objectives of the Manitoba Hazardous Waste Management System, as outlined in the Act, are summarized below:

- to establish, operate and maintain in accordance with all applicable laws in the province, a hazardous waste management system for Manitoba;
- to research, develop, establish, own, operate and maintain facilities for the transmission, reception, collection, examination, storage, treatment, recycling and disposal of hazardous wastes;
- to ensure that the hazardous waste management system is established, operated and maintained in a manner that will protect the health and safety of

the public and preserve the environment; and

- to ensure the protection of health and safety of the public and the preservation of the environment following the closure of the hazardous waste management facilities established as part of the system.

These objectives govern the overall activities of the Corporation and must be addressed in the site selection process. The following specific objectives will guide the development and implementation of the site selection process:

- the process must identify environmentally acceptable site alternatives;
- the process must identify site alternatives that ensure protection of public health and safety;
- the process must identify technically and economically feasible site alternatives; and
- the process must seek and respond to public concern and input, both provincially and locally, with the objective of obtaining support for the system's development generally, and local public support for site alternatives in particular.

These objectives recognize the need to incorporate and integrate environmental, technical, economic, and social criteria in the search for candidate sites.

2.2.2 System Development

In order to achieve these objectives, the Hazardous Waste Management System must be universal, providing equitable service and non-selective access to all Manitoba hazardous waste generators. The system development approach will incorporate the following principles:

- exploit the potential for source based waste management;
- take the time to select and size system facilities;
- optimize the system economics and capital commitment;
- public input must be included in the development process; and

- public acceptance is fundamental to facilities development.

The overall system development approach adopted by the Corporation involves development of the system on an incremental basis as the need for specific components and/or technology is justified. The first stage of development will be a basic system which incorporates collection infrastructure, and centralized storage facilities with bulking and volume reduction capability. The second stage of development will add waste treatment and disposal technologies to establish a fully integrated operating system.

Two studies have recently been commissioned to assist in defining system requirements and scope. These include a technology review of applicable waste treatment processes and a provincial waste market characterization. These studies will help define the quantities and types of wastes available to the system and will identify treatment technologies best suited to handle anticipated waste streams.

It is assumed that the system may ultimately involve a central facility capable of providing storage, treatment and disposal for all provincially regulated hazardous waste, supported by a number of regional transfer stations. The operational portion of such a central facility site, based on the experience of other jurisdictions, will require from five to twenty hectares (12 to 50 acres). Additional land will be required for potential facility expansion and dedicated buffer zones. Other fully integrated facilities in Canada have established a total land requirement of approximately 130 hectares (320 acres).

The transfer stations will be small consisting primarily of a warehouse/office building and associated materials handling facilities. Land requirements for transfer stations are minimal and facilities could be placed within a standard industrial park lot or in addition to existing municipal waste collection/disposal operations.

The following assumptions have been made to guide the development of the siting process:

- the site selection process will address overall system requirements (ie. location of potential facility sites as well as regional transfer stations);

- two sets of siting criteria will be required; one to address regional transfer stations and one to address facility siting;

- criteria developed for facility siting will assume that a fully integrated waste storage, treatment and disposal facility will ultimately be required to meet provincial needs. Criteria will be developed to address the specific requirements of the following generic facility components:

- analytical facility;
- centralized storage, materials handling and volume reduction facilities;
- physical/chemical treatment facility;
- organic waste treatment facility (incineration);
- treatment residue stabilization facility; and
- treatment residue repository.

o currently available estimates of waste types, distribution and quantities (Yee et.al., 1985) will be assumed initially and updated as more current estimates of the waste market are available; and

o as the system proponent, the Corporation will proceed with project planning and development pursuant to all applicable laws and regulations of the province of Manitoba.

The site selection process will incorporate these assumptions in the development of siting criteria to ensure that overall project requirements are addressed.

The site selection process, as proposed, concentrates on the identification and selection of a central facility site. Transfer stations will function as the "door to the system" and consequently will be developed to meet regional hazardous waste management requirements. The optimal locations for transfer stations will depend in part on the location of the facility site. Criteria developed for siting transfer stations will be utilitarian in nature, concentrating on factors related to waste distribution, transportation, technical suitability, economic viability and joint venture opportunities.

3.0 SITING HAZARDOUS WASTE MANAGEMENT FACILITIES IN THE UNITED STATES

Prior to the development of a proposed site selection process for Manitoba a review was conducted of the requirements and approaches adopted in other jurisdictions. The following sections briefly summarize the situation in the United States with respect to siting hazardous treatment and disposal facilities. Specific information on siting criteria required under federal regulations (U.S. EPA location guidelines) and individual State site selection criteria and siting experiences are presented in Appendix A.

3.1 Jurisdiction and Siting Criteria

The management of hazardous wastes in the U.S. falls primarily under federal control. The U.S. EPA under a set of federal legislation including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) and the Superfund Allocation and Reassessment Act (SARA) has the responsibility to manage and control releases of hazardous materials and to remedy contamination caused by any hazardous substance (Machlin, 1987).

In 1984, Congress amended RCRA by enacting the Hazardous and Solid Waste Amendments (HSWA) which require the U.S. EPA to specify location standards for RCRA licensed treatment, storage and disposal facilities (Temple, Barker & Sloane Inc., 1987). The U.S. EPA subsequently published criteria for identifying areas of vulnerable hydrogeology and technical methods for determining ground water susceptibility (U.S. EPA, 1986). The U.S. EPA has prepared more detailed location standards for hazardous waste treatment and disposal facilities under RCRA. These draft regulations are currently being reviewed and are expected to be promulgated in the fall of 1989 (pers. comm. G. R. Galen, May 1988).

The new regulations will establish a minimum set of criteria that facility proponents will have to incorporate in the site selection process. Individual States can enforce more stringent siting criteria, provided that the U.S. EPA criteria are satisfied.

3.2 Summary: Facility Siting Experience

Since 1972, thirty-six States have enacted hazardous waste siting statutes. Thirty-one of these have developed a formal siting process for hazardous waste facilities and ten States have formulated State hazardous waste management plans (Condron & Sipher, 1987).

A total of eighty-one applications for commercial hazardous waste treatment or disposal facilities in twenty-eight States have been submitted since State siting initiatives were enacted (1980). Of these, thirty-six are still in progress. Fourteen applications have been approved under RCRA however, only six of these have proceeded to become operational facilities. Based on a review of State initiatives for siting hazardous waste treatment facilities, Condron and Sipher (1987) came to the following conclusions:

- State involvement and initiative in the siting process has promoted siting activity by facility proponents;
- extensive public participation and consultation programs promote siting activity and certain elements of the public participation process appear to promote siting approval;
- neither strong State initiative nor extensive public participation programs are essential to siting success;
- landfills and incinerators are harder to site successfully than treatment facilities; and
- siting success is influenced strongly by the individual circumstances surrounding each application.

The U.S. EPA has required all States to demonstrate their capabilities to manage hazardous wastes for a twenty year period pursuant to the Superfund Amendment and Reassessment Act (SARA) (Condron & Sipher, 1987). With this new directive, States will come under increasing pressure to site and develop hazardous waste treatment facilities.

4.0 SITING HAZARDOUS WASTE MANAGEMENT FACILITIES IN CANADA

The following sections summarize the responsibilities of government agencies for hazardous waste management in Canada. In addition, a summary of siting criteria and siting approaches adopted for hazardous waste treatment facility proposals in Canada is presented. Detailed information on site selection criteria and siting approaches adopted in Alberta, Ontario and British Columbia are presented in Appendix B.

4.1 Jurisdiction

Hazardous waste management, in Canada, is a provincial responsibility (Hay, 1984). The jurisdiction of the federal government in waste management issues is limited to the following areas:

- transboundary matters, both international and interprovincial in nature,
- product control - addressing the eventual disposal of the product,
- public safety - addressing health and environmental effects, and
- activities on federal Crown lands and federal facilities (Winston, 1985).

The federal government has been most active in developing a unified definition of hazardous wastes, providing inventories of wastes, funding research projects in waste management and technology development and monitoring and controlling the transboundary movement of wastes. Through the Environmental Contaminants Act (1976), the federal government can regulate the importation, use and management of selected compounds which have a national perspective (eg. PCB's).

Traditionally, the federal government's role has been to provide information and guidance to industry and the provinces to promote the development of a unified hazardous waste management system in Canada. This role may change significantly in the future with the implementation of the new Environmental Protection Act.

4.2 Site Selection Criteria

There are no federal regulations or guidelines governing the site selection process for hazardous waste management facilities. Most provinces have established minimal location

standards for waste disposal facilities. Although these location standards relate primarily to the siting of solid waste landfills, some provinces have addressed the more complex siting requirements of hazardous waste management facilities. Table 1 summarizes current provincial acts and regulations regarding location standards.

A number of provinces have either sited, or are actively involved in the siting and development of hazardous waste treatment and disposal facilities in their jurisdictions. In view of the limited location standards afforded by existing regulations it is the responsibility of individual proponents to develop and apply siting criteria which are

TABLE 1
Summary of Provincial Location Standards for Waste Management Facilities

Province	Act/Regulation	Application
Alberta	Public Health Act, Waste Management Regulation 250/85	Landfills
British Columbia	Waste Management Act, Special Waste Regulations	Hazardous Waste Facilities
Manitoba	Environment Act, Waste Disposal Ground Regulations	Landfills
Ontario	Environmental Protection Act, Waste Management. General Regulations	Hazardous Waste Facilities
Quebec	Environment Quality Act Hazardous Waste Regulation	Waste Treatment and Disposal Facilities
Saskatchewan	Environmental Management and Protection Act, The Mineral Resources Act	Landfills

applicable to their particular situation. The siting process will receive regulatory and public review pursuant to provincial project development (environmental assessment) guidelines and/or regulations.

Facility Development in other Provinces

4.3.1 Alberta

The Alberta Special Waste Management Corporation (ASWMC) has successfully sited and developed a hazardous waste treatment and disposal facility at Swan Hills, Alberta. The siting process began in 1981 and included an extensive public participation program. A set of siting criteria were developed early on in the process to delineate lands which could be considered as candidate locations on a provincial basis. These criteria included physical, biological, land use and human constraints (McQuade-Cook & Simpson, 1986).

In 1981, all counties, municipal districts, improvement districts and special areas designated in the province were included in and received briefing sessions on the site selection process. General information on the types of criteria which may be used in the siting process were included. Following these initial information sessions, local authorities were given the option of participating further in the program. In order to proceed, local authorities were required to write a formal invitation to assess the suitability of siting a facility in their jurisdiction. Written submissions were received from 52 of a possible 70 jurisdictions. Studies were then undertaken in these jurisdictions by the government, at no cost to the municipality, and results were made available to the public. Twenty-five percent of the areas studied requested further consideration as a possible host community for the facility

Many areas were excluded on environmental grounds, while others were eliminated because of vocal public opposition. A total of five potential host communities underwent more detailed site selection processes which included site specific geotechnical investigations. All five areas held plebiscites to establish public support for the facility. Officially, two primary sites, Swan Hills and Riley, emerged from this process. Both sites were presented as acceptable alternatives by the Corporation and the final selection was made by a Cabinet decision.

The Alberta site selection process weighed heavily on public support to identify candidate regions. Site selection criteria used in the identification and evaluation of alternate sites are presented in Appendix B.

4.3.2 Ontario

The Ontario approach to site selection concentrated on identifying the "ideal site" that would meet all of the program's objectives and siting criteria (OWMC, 1988). The site selection process began in the early 1980's with the identification of the candidate region (the Golden Horseshoe region of Southern Ontario). Factors employed in the selection of the candidate region included hydrogeology, surface water, atmospheric dispersion, environmentally sensitive areas, engineering infrastructure, land use and transportation.

The next step in the siting process was the identification of candidate areas and the selection of candidate site areas within them. A total of 20 candidate areas, containing 152 potential site areas, were identified through this process. Site areas were then evaluated using initial screening criteria ultimately reducing the candidate site areas to 16. A more detailed look was then undertaken to evaluate the major risks and impacts associated with the site options to identify candidate sites within these areas. The siting process identified eight candidate sites, three of which were considered acceptable for development of a fully integrated facility. Another, more detailed site selection process was implemented to select preferred alternatives from the candidate sites. Finally, the West Lincoln site was selected as the preferred alternative (OWMC, 1988).

The Ontario site selection process was very comprehensive and included an active public participation program. However, formal host community support for the site was not solicited.

An Environmental Impact Assessment has been submitted to the Ministry of Environment for development of the West Lincoln site. The project is currently undergoing formal review by the Ministry and a public hearing pursuant to Ontario regulations is required prior to project approval.

4.3.3 British Columbia

British Columbia has recently embarked on the development of an integrated hazardous waste management facility for the province. A consortium of private companies (B.C. Special Waste Services Inc.) has been selected by the provincial Special Waste Advisory Committee (SWAC) to act as proponent for the project (pers. comm. Mr. T.W. Finnbogason, March, 1988). The site location will be selected by the proponent with input from (SWAC).

Preliminary site selection considerations have been developed. These siting considerations have been technically reviewed by SWAC as part of the proponent's proposal. Communities have been contacted to identify potential host regions. A detailed site selection process will be conducted within the host community selected for the project.

5.0 THE SITING EXPERIENCE IN PERSPECTIVE

The siting of hazardous waste management facilities has been a major issue in the United States since the early 1980's and interest has intensified in recent years as a result of the U.S. EPA's new initiatives under SARA. Each State must now assure the Agency that they will have adequate facilities for disposing of their hazardous wastes for 20 years. The U.S. EPA can withhold federal funds for remedial action if States do not comply with this requirement (Temple, Barker & Sloane, Inc., 1987). This requirement has prompted most States to initiate the search for facility sites if the process was not already in progress.

There are numerous examples of siting programs in the U.S. Experience there suggests that finding a site which meets regulatory, local government and public approval is an almost impossible task. The process can be extremely time consuming. As described in Appendix A, New Jersey has yet to site a facility and their process has been in place since 1982 (Gimello, 1988). North Carolina established its Waste Management Board in 1981 and the Hazardous Waste Treatment (Facility Siting) Commission in 1985. Work has been in progress to site a facility since 1981. However, recently proposed sites met with such local opposition that they were dropped from consideration and the search is continuing (pers. comm. A. G. Turner, 1988).

Some States are having more success with their facility siting programs. The Minnesota approach, which incorporates a proactive public participation program aimed at local communities, appears to be meeting with success in attracting community interest in hosting a facility (Appendix A). A facility has recently been sited in Arizona and steps are presently being taken to obtain regulatory approval for an integrated hazardous waste treatment facility there (pers. comm. J. Danielson, 1988). Both of these siting processes relied heavily on local public support for the project prior to initiating detailed siting exercises.

In Canada, only Alberta has successfully sited and developed an integrated hazardous waste management facility. Their process included extensive public participation and local public support weighed heavily in the final selection of the Swan Hills site (McQuade-Cook & Simpson, 1986). That process took approximately four years to identify the site and an additional four years to achieve full system operation.

The Ontario proposal is currently being reviewed. The siting process has taken approximately seven years and site approval has yet to be achieved. British Columbia has set a deadline to site a facility by the summer of 1988 and have a facility operational by the fall of 1989. Their siting program is relying on finding a receptive host community in order to achieve their optimistic development schedule. In addition, an environmental impact assessment and formal regulatory hearing will not be required in British Columbia whereas,

these components would be required in most other jurisdictions.

In summary, finding a site for a hazardous waste management facility will never be an easy task. The level of public interest and concern can be expected to be very high initially and will intensify as the search for candidate sites proceeds. However, experience in other jurisdictions suggests that recognition of this fact and early involvement of the local public, particularly in the decision-making process, may be the most appropriate approach to achieve an equitable solution.

6.0 PROPOSED SITE SELECTION PROCESS FOR MANITOBA

Based on the experience of other jurisdictions, the site selection process is, perhaps, the single most difficult step in developing a hazardous waste management system. In addition, there is a recognized need to keep the public informed of siting initiatives and incorporate the direct input of the local public in the site selection process.

The Government of Manitoba has recognized the need to develop a provincial hazardous waste management system and through the initiatives of the Department of Environment & Workplace Safety & Health and the Clean Environment Commission has conducted a series of public meetings and hearings on hazardous waste management issues. Throughout this process, emphasis has been placed on incorporating public, industrial and institutional stakeholder response into the program.

The proposed site selection process incorporates the experience gained from examining siting programs in other jurisdictions and the recommendations of the CEC to gain public acceptance and approval of the program through continuing opportunities for direct public involvement. In this context, the process should be viewed as a continuation of the program conducted over the past five years. This program has created a high level of public awareness and involved a broad range of stakeholders. It is the Corporation's policy to continue this involvement without restriction in an open and proactive way.

6.1 Definitions

The following definitions are presented to clarify terminology used in the description of the site selection process:

Stakeholder - refers to any directly affected or concerned group including individuals; residents of specific areas; public interest and advocacy groups; individual industrial and institutional waste generators; industrial associations; government agencies (including municipal, provincial and federal); and community leaders.

Region - refers to an area, defined by the use provincial screening criteria, which exhibits similar constraints to the siting of a facility.

Community - an administrative unit, defined by existing urban or municipal boundaries.

Host Community - a "community", or "group of communities", which has expressed an interest in potentially sponsoring siting of a facility within their jurisdiction.

Candidate Host Community - a "host community" selected for detailed investigation for potential facility sites. Because of the nature of the facility, and potential interest in it, traditional "community" boundaries will be expanded as necessary to include all local stakeholders who would legitimately anticipate being affected by the development.

Community Advisory Committee - a committee of representatives selected by the Candidate Host Community to represent their interests in the site selection process.

6.2 Proposed Site Selection Process

There is no "formula" which can guarantee the successful siting of a hazardous waste management facility. Experience in the United States suggests that the process can be extremely lengthy, expensive and unsuccessful if not conducted properly. Furthermore, it is impossible to prejudge the situation and anticipate all potential roadblocks in the siting process. Therefore, it is essential that the process be flexible, evolutionary and incorporate a proactive public and stakeholder participation program.

The proposed site selection process for the Manitoba Hazardous Waste Management System will be conducted in a phased, "step-wise" fashion (Figure 1). Site selection, for the central facility, will initially look at the entire province and, through progressive review and implementation of siting criteria, focus on smaller regions and local areas. The facility site selection criteria will be refined in each Phase with input from appropriate government agencies, stakeholders and the general public. Direct public participation in the development of the Phase 3 detailed siting criteria is a key feature of the process.

The process for selection of transfer station locations will be generally similar to, and conducted parallel with, selection of the facility site.

Key steps in the site selection process are discussed in the following sections.

FIGURE 1
PROPOSED SITE SELECTION PROCESS

PHASE 1
Site Selection Process and Criteria Development

KEY STEPS

- o Background Information Collection and Government Agency Input
- o Prepare Site Selection Process Document
- o Prepare Proposed Site Selection Criteria
- o Provincial Screening to Identify Candidate Regions
- o Selection of Candidate Regions
- o Public and Stakeholder Review of Process

PHASE 2
Selection of Candidate Host Communities

KEY STEPS

- o Data Collection on Candidate Regions
- o Technical Screening of Regions
- o Community Consultation in Candidate Regions
- o Define and Evaluate Potential Candidate Host Communities
- o Select Candidate Host Communities

PHASE 3
Site Selection and Evaluation

KEY STEPS

- o Establish Community Advisory Committee(s)
- o Finalize Siting Criteria and Identify Mitigation Issues with Committees
- o Identify Candidate Sites
- o Detailed Evaluation of Candidate Sites
- o Confirmation of Community Support
- o Site Ranking and Identification of Preferred Development Alternatives
- o Preparation of Regulatory Proposal

6.2.1 Phase 1: Site Selection Process and Criteria Development

This Phase of the process deals at the provincial level and includes preparation and distribution of general information on the Corporation and the proposed siting process and site selection criteria. A province-wide screening, using "exclusionary" criteria, will be conducted during Phase 1 to define those regions where future site selection efforts should be concentrated. Information will be prepared for, and distributed to, provincial stakeholders and the general public for review and comment. Figure 2 presents the proposed Phase 1 process. Key steps in the process are identified by number and are referred to in the following discussion.

(1) Background Information Collection

Background information on site selection processes and site selection criteria from other jurisdictions will be collected, reviewed and incorporated into the proposed process. Input from key government departments will be included in the identification of provincial screening criteria. Pertinent information collected through this process including the response at public open houses, briefs submitted by environmental groups and formal response from government agencies, will be incorporated and referenced in Corporation publications.

(2) Site Selection Process Development

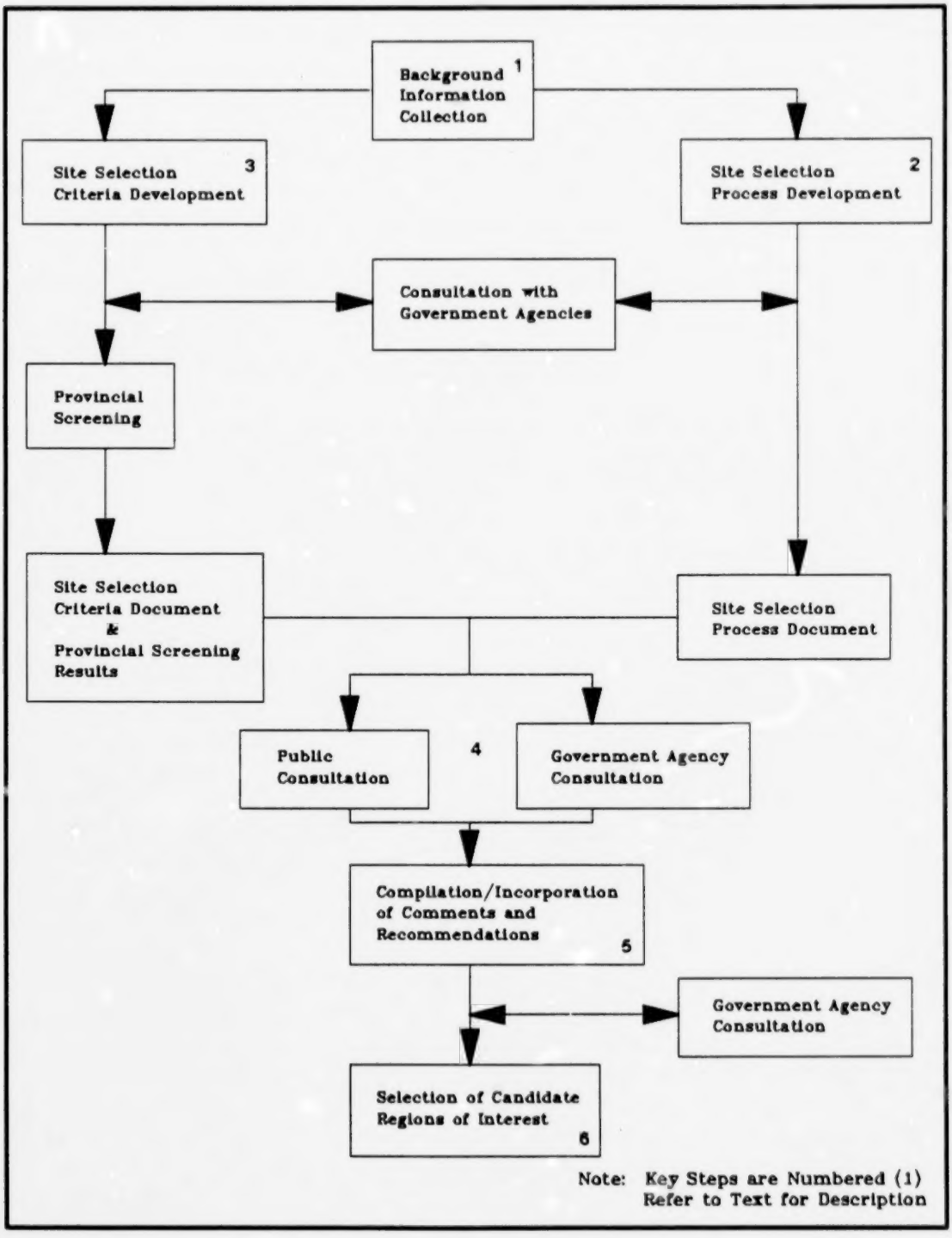
The publication of a process document is the end result of the site selection process development step. It will outline the proposed site selection process in detail and will be prepared for public distribution and review. Documentation of approaches and siting requirements in other jurisdictions, which were reviewed in the preparation of the document, will be referenced.

(3) Site Selection Criteria Development

A set of proposed site selection criteria will be developed to provide a consistent framework for the ultimate identification and ranking of candidate sites. Separate criteria will be proposed for the facility site and transfer stations. Also, it will be necessary to develop several levels of siting criteria. Each level will become more specific and will incorporate more regional and local concerns.

The initial criteria proposed will be general in nature and will include information useful for the future refinement of criteria, relative to the incorporation of local siting concerns and issues. Criteria for the facility site will include technical, environmental and land use components. The objective for the application siting criteria is to identify acceptable

FIGURE 2
PHASE 1: SITE SELECTION PROCESS AND CRITERIA DEVELOPMENT


Background Information Collection 1
Site Selection Criteria Development 3
Site Selection Process Development 2
Consultation with Government Agencies
Provincial Screening
Site Selection Criteria Document & Provincial Screening Results
Site Selection Process Document
Public Consultation
4
Government Agency Consultation
Compilation/Incorporation of Comments and Recommendations 5
Government Agency Consultation
Selection of Candidate Regions of Interest 6
Note: Key Steps are Numbered (1)
Refer to Text for Description

regional alternatives from environmental and technical perspectives and achieve the following:

- o minimize environmental and public health and safety risk associated with facility operation through provision of natural barriers to emissions and/or their consequences;
- o minimize the potential for accidents resulting from natural or human occurrences;
- o minimize the consequences associated with accidental occurrences; and
- o develop local public support for the facility.

Criteria developed for transfer stations will be more utilitarian in nature, recognizing the need to provide easy access to the system. Although siting criteria for transfer stations will incorporate technical, environmental and land use components, they will allow greater latitude for application of engineering controls to ensure the above-mentioned objectives can be met.

In order to provide some direction to those areas of the province where facility development has the greatest potential, the site selection document will also present "exclusionary" screening criteria and results of the province-wide screening process. Key government departments will be consulted during this process to assist in defining the provincial screening criteria.

All regions will be included in the initial screening process to ensure that all potentially acceptable facility site locations are identified. A provincial constraint map, based primarily on existing biophysical, resource, and land use information will be prepared.

Constraint mapping, because of the scale and detail of the information used in the process, will reflect a region's relative suitability to accept a hazardous waste management facility rather than defining whether or not a facility will be acceptable within a given region. For example, the probability of finding a suitable site within a region exhibiting no constraints would be much higher than in a region exhibiting significant constraints in one or more of the screening criteria.

A site selection criteria document will be prepared identifying the proposed site selection criteria and results of the provincial screening process. This document will identify, to stakeholders, those regions where future facility site selection activities will be concentrated and will propose criteria for selection of both the facility site and regional transfer stations.

(4) Public and Government Agency Consultation

Once completed, all documents will be distributed to stakeholders for review and comment. Reports, including general information on the Corporation and it's activities, the site selection process document and the site selection criteria document, will be distributed as soon as they are available. Distribution of reports will include all interested government departments and agencies, all regional planning authorities, regional development corporations, urban and municipal associations, all urban and rural municipalities, interested environmental or public interest groups and interested individuals.

Public information will be disseminated using a variety of methods. Information packages will be distributed to all public libraries, municipalities, Chambers of Commerce, interested associations and known environmental groups or organizations. General newspaper articles may be prepared outlining the site selection process and identifying where more information is accessible.

Corporation staff will be available to make presentations to interested environmental groups or community organizations. A series of regional "Open Houses" will also be scheduled to present information to the public, listen to concerns and solicit response to the proposed siting criteria and siting process.

(5) Compilation and Incorporation of Comments and Recommendations

The general response of the public from open houses and formal response from government agencies and stakeholders to the siting process and criteria documents will be compiled in a formal report. This report will act as the main "working document" for future use in defining community specific site selection criteria in Phase 3. This report will be made available to all interested parties.

(6) Selection of Candidate Regions of Interest

The final step in the Phase 1 process will be the selection of candidate regions. Candidate regions will be selected on the basis of potential siting constraints identified in the provincial screening process and the response of both the public and government agencies expressed through the consultation process. Further site selection activities will be concentrated in these regions.

6.2.2 Phase 2: Selection of Candidate Host Communities

Phase 2 site selection activities will be conducted at the regional level. Information used in the selection of candidate regions will be verified and more detailed information on

candidate regions will be compiled. The public consultation process will concentrate on local communities within candidate regions. The final steps in the Phase 2 process will be the identification of candidate host communities.

Figure 3 presents a flow diagram highlighting the main steps in the Phase 2 process. Key steps in the process are discussed in the following sections.

(1) Data collection and Verification

This technical data collection and verification step will collect more detailed information on technical, environmental and socio-economic characteristics of the candidate regions. These data will be used to confirm the provincial constraint mapping information and provide additional information for subsequent detailed site selection initiatives.

(2) On-going Community Consultation

Public participation and consultation programs will be directed at local communities within candidate regions. Local information sessions will be sponsored to provide community leaders and the general public with more detailed information on the site selection process. A framework for future consultation, negotiation and community feedback will be presented. The objective of this step is to work at the community level to identify potential interest and/or support for facility development.

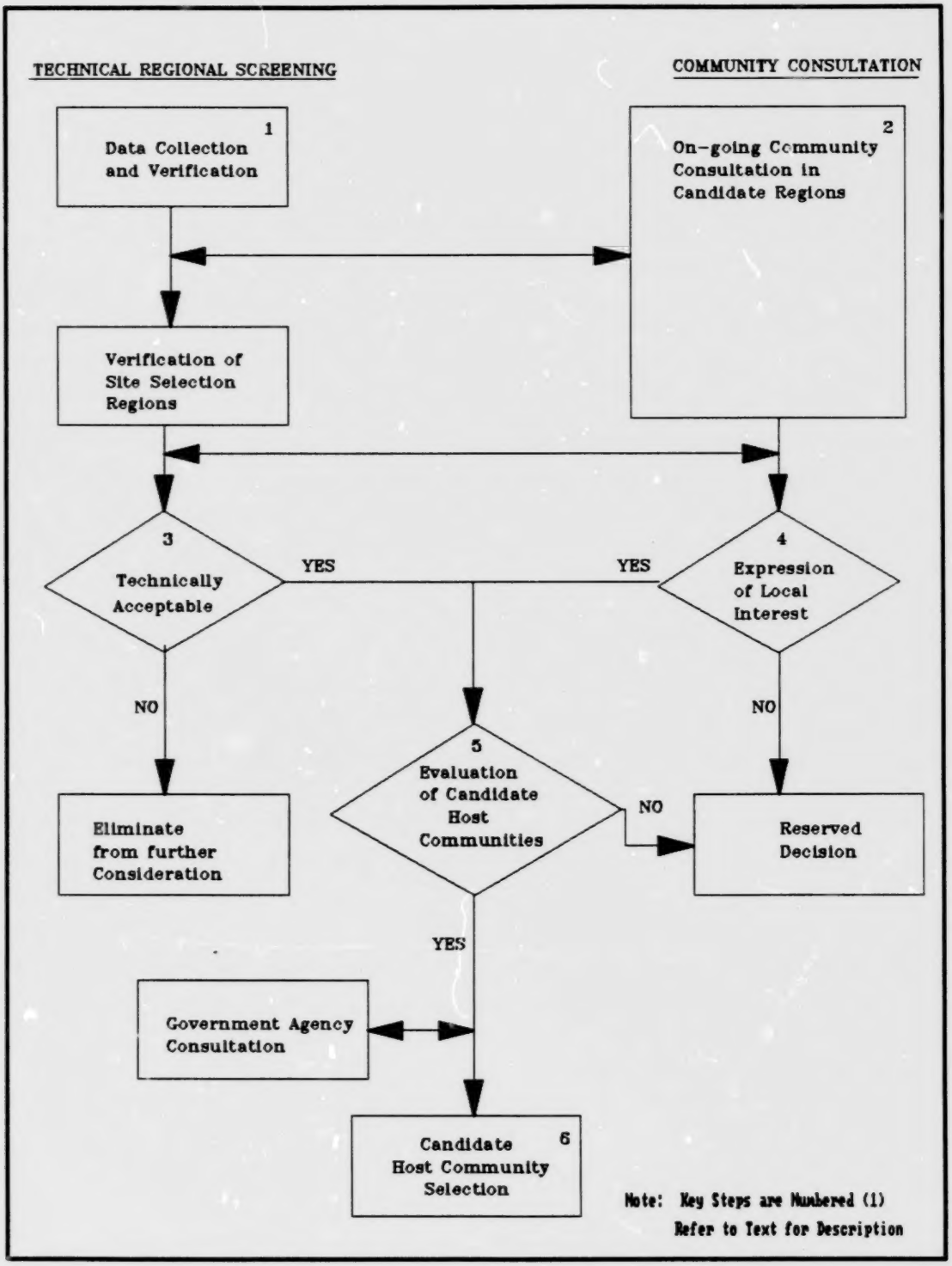
(3) Technical Screening

Data collected in step 1 will be used to verify the original results of the provincial screening process. If significant constraints to siting are identified during this more detailed evaluation, the region (or portions of) will be eliminated from further consideration. Regions (or portions of) which are confirmed to be technically acceptable will proceed to the next step in the site selection process.

(4) Expression of Local Interest

The response of local community leaders and the public to the consultation process will be used to gauge potential support for facility development within their community. Communities expressing continued support or interest will be considered as potential candidate host communities. Those communities which do not support the project will not undergo further evaluation as a potential candidate host community at this time.

FIGURE 3
PHASE 2: SELECTION OF CANDIDATE HOST COMMUNITIES



(5) Evaluation of Candidate Host Communities

The results of Step 3 (Regional Technical Evaluation) and Step 4 (Expression of Local Interest) will be combined and evaluated. Those communities expressing interest in the project which are confirmed to be in technically acceptable regions will be considered further as potential candidate host communities. Those interested communities in regions (or portions of) which are not technically acceptable will not be considered further at this time.

(6) Candidate Host Community Selection

The final step in the Phase 2 program is the selection of candidate host communities. Those communities which meet the technical screening criteria and demonstrate continuing public support for the project will be invited to register as a candidate host community.

The next Phase in the process (Site Selection and Evaluation) will involve costly and time consuming site specific investigations. Candidate host communities will be encouraged to demonstrate their continuing support for the project and, prior to proceeding, the Corporation will endeavor to confirm local public support. This will be achieved through a variety of formal and informal methods such as public response at open houses and attitude surveys. The use of referendums or motions of elected councils could also be used by the communities themselves at this time. The Corporation will develop a system for evaluating public response to the project which can be applied to all candidate host communities.

It should be noted that no absolute commitment of support is required from a community at this stage. All candidate host communities are entitled to review all site specific information prior to committing support for the project. Participation in the program is completely voluntary and communities are free to withdraw from further consideration at any time in the process.

Candidate host communities will be selected by the Corporation based on the following:

- must be located in a technically acceptable area;
- must demonstrate an on-going interest in potentially hosting a facility; and
- must be located in an area which will meet the Corporation's system development objectives.

Candidate host communities will be selected from those registering as such by the Corporation. Those not selected, and those eliminated at earlier stages, will be evaluated

as potential sites for transfer stations. A similar open and consultative process will be followed to select optimum locations for transfer stations.

6.2.3 Phase 3: Site Selection and Evaluation

The Phase 3 process includes the identification and ranking of site alternatives within candidate host communities. Phase 3 will culminate with the recommendation of a preferred and alternate site(s). The Phase 3 process is presented in Figure 4 and key steps are discussed in the following sections.

(1) Establish Community Advisory Committee(s)

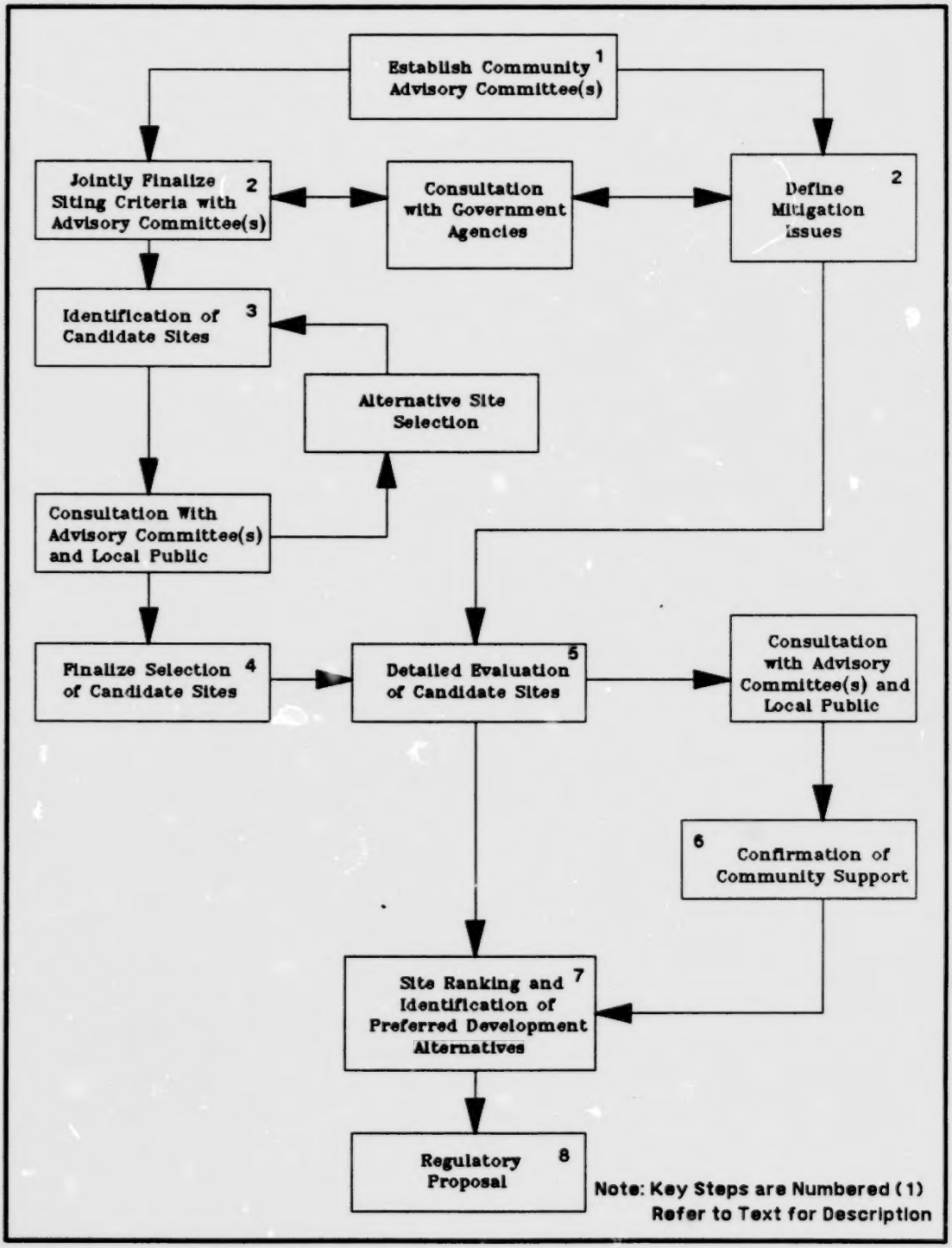
The first step in the detailed site selection process will be defining the boundaries of the candidate host communities and establishing a Community Advisory Committee in each. These committees will be selected locally and may be comprised of municipal government representatives, appointed members of the general public who have expressed an ongoing interest and/or concern, representatives of the local business community and representatives of local environmental, agricultural or community groups. The selection of Committee representatives is envisioned as being community determined and as a consequence, its composition and structure will be unique to each community. The Community Advisory Committees will have the responsibility of representing the public interest in future facility planning exercises and will take an active part in all future public open houses and meetings.

(2) Jointly Finalize Siting Criteria with Community Advisory Committee(s)

The Advisory Committees will develop detailed site selection criteria in consultation with the Corporation. Workshops will be held, under the direction of a trained facilitator, to develop criteria and identify weighting factors. All background information collected in the initial development of the proposed site selection criteria and all comments and concerns presented by stakeholders in review of these criteria will be available to the Advisory Committees. If several host communities are under investigation at this time, representatives of each Advisory Committee may be selected to participate in a final workshop where a commonality of criteria and weighting factors will be discussed. These criteria, representing the new minimum siting requirements, will then be applied in the detailed site investigations.

The weighting factors developed through this process will be applied consistently to evaluate all candidate sites. Therefore, all candidate sites will be subject to the same

FIGURE 4
PHASE 3: SITE SELECTION AND EVALUATION


Establish Community Advisory Committee(s) 1
Jointly Finalize Siting Criteria with Advisory Committee(s) 2
Consultation with Government Agencies
Define Mitigation Issues 2
Identification of Candidate Sites 3
Alternative Site Selection
Consultation With Advisory Committee(s) and Local Public
Finalize Selection of Candidate Sites 4
Detailed Evaluation of Candidate Sites 5
Consultation with Advisory Committee(s) and Local Public
6 Confirmation of Community Support
Site Ranking and Identification of Preferred Development Alternatives 7
Regulatory Proposal 8
Note: Key Steps are Numbered (1)
Refer to Text for Description

evaluation process and the objective of direct public involvement in the decision-making process will be achieved. The Advisory Committees will also provide guidance to the Corporation on local concerns with respect to project development and operation and help define mitigation issues for consideration in the detailed site evaluation (environmental assessment) step.

(3) Identification of Candidate Sites

Siting criteria and weighting factors developed through this process will include location sensitive technical, environmental, and land use factors only. Corporation staff will use these criteria to identify potential candidate sites within each host community. Pertinent environmental and land use constraints will be mapped on a series of overlays to identify areas where the finalized siting criteria can be achieved. Candidate sites will be selected in these areas and results will be presented to the public.

(4) Finalize Selection of Candidate Sites

Results of the site identification process will be presented to the Community Advisory Committees and the public for comment. Response to proposed sites, and potential fine tuning of the siting criteria with the Committees, will help identify preferred site alternatives in each host community. The final selection of candidate sites will be made by the Corporation incorporating public feedback and direction from Advisory Committees into the decision-making process.

(5) Detailed Evaluation of Candidate Sites

Specific information requirements will be identified and detailed site investigations will be conducted on each candidate site. Site investigations will include on-site surveys (eg. hydrogeological studies) to provide the level of detail required to make professional judgements with respect to relative site suitability for facility development. These investigations will be conducted under the direction of the Corporation and Community Advisory Committees will assist in the development of the terms of reference and have access to all study reports.

Formal meetings will also be held with Manitoba Environment & Workplace Safety & Health, and other official regulatory agencies as appropriate, to identify specific information requirements for preparation of an environmental impact assessment (EIA) pursuant to the Environment Act. The preliminary scope of work and information requirements for the EIA will be defined at this time and appropriate data collection programs included in the site studies.

Results of detailed site investigations will be presented to the public and reviewed in detail with Advisory Committees prior to the final selection of the preferred site alternatives.

(6) Confirmation of Community Support

Prior to making a final site decision, it will be necessary to obtain confirmation of community support for the project. Host community participation in the site selection process was voluntary and communities were free to withdraw at any time. However, at this stage of project planning it is important that host communities being considered for facility development provide a final declaration of public and community support. The Corporation will work through the Community Advisory Committees and local government councils in establishing this confirmation of community support.

(7) Site Ranking and Identification of Preferred Development Alternatives

It will be possible, through this process to identify and rank a set of alternate sites, all of which may provide acceptable development alternatives. The criteria and ranking system developed in consultation with Advisory Committees will provide the basis for ranking of sites on technical, environmental and land use merits. The Corporation will use this information in making its final site selection. However, other considerations such as economics and perceptions of sustained public support or the probability of success must ultimately be included into the Corporation's business decision on the site it puts forward in its formal development proposal.

(8) Regulatory Proposal

A recommendation will be made by the Corporation to its Board of Directors to submit a proposal to the Director of Manitoba Environment & Workplace Safety & Health, pursuant to the Dangerous Goods Handling and Transportation Act, for the development of a hazardous waste management facility at the preferred site. An alternate site(s), which meets all of the technical criteria will also be identified, if possible. This development proposal will outline details of the proposed facility and provide documentation of the site selection process. Although this application does not fall directly under the jurisdiction of the Environment Act, the process outlined in that Act for the preparation and review of an Environmental Impact Assessmsnt will likely be followed. Therefore, copies of the proposal and supporting documentation, including the site selection report and the environmental impact assessment, will be placed in the public registry for public review.

6.3 Summary

The proposed site selection process has a number of key features that should facilitate the task of identifying a facility site. These include:

- the process follows a logical planning process for the identification of potential facility sites;
- the process will be conducted in the public forum with all relevant information available to all interested parties;
- the process provides significant opportunities for public input with the greatest emphasis placed on direct involvement by local communities
- participation in the program will be voluntary and potential host communities can withdraw from consideration at any time in the program

In summary, the Corporation believes that the major barrier to a successful siting program is the perception by the public that decisions directly affecting their well-being or quality of life are being imposed on them by outside vested interests. Traditionally this includes the proponent, waste generators from outside the region, government officials and some advocacy interests. To avoid this perception, the Corporation is proposing a dynamic process involving the elements of local responsibility and "co-management" in the site selection decision-making process. It is hoped that this model will prove effective and can be extended to the development and operation stages with direct local community based participation in the Corporation's activities.

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APPENDIX A

SITE SELECTION CRITERIA AND APPROACHES IN THE UNITED STATES

The following sections outline siting criteria and site selection processes in the United States. Criteria recommended by the U.S. EPA are outlined. In addition, criteria and approaches applied in a number of States which have, or are in the process of siting a hazardous waste treatment facility, are presented.

APPPENDIX A

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A 1.0 U.S. EPA Siting Guidance Manual

The U.S. EPA has prepared a guidance manual for the siting of hazardous waste land storage and disposal facilities (U.S. EPA, 1985). The document was prepared in 1985 and presents criteria defining acceptable physical locations and applicable U.S. regulations. The U.S. EPA is currently developing a new set of criteria which will be promulgated in regulations as the minimum location standards for land storage and disposal facilities. These criteria are currently being reviewed and are expected to be enacted by the fall of 1989 (pers. comm. Mr. G.R. Galen).

At present the U.S.EPA, through its guidance manual, has established siting guidance and/or criteria in five general areas as outlined below:

- Site Characterization;
- High Hazard and Unsuitable Terrain;
- Ability to Monitor at Location;
- Protected Lands; and
- Vulnerable Hydrogeology.

Criteria in each of these areas is summarized in the following sections.

A 1.1 Site Characterization

Site characterization refers to the inherent geologic, hydrologic and pedologic features of the site. It is recommended that a detailed site characterization be conducted. This information would be used to determine compliance with siting criteria and to provide information suitable to predict groundwater movement and transport of constituents should the engineered containment unit fail.

A 1.2 Geologically Complex Locations

Certain geologically complex areas will require more extensive investigation to meet the characterization performance requirements. However, from a practical perspective not all sites can be adequately characterized due to complex hydrogeologic conditions. In addition, geologically complex areas may be unsuitable for development due to unstable or high risk of failure characteristics. These areas, as outlined below, should be avoided in the site selection process:

- o geologically complex areas including karst terrain or fractured bedrock;
- o high hazard and unstable terrain including areas exhibiting landslide, subsidence, vulcanism or seismic events; and
- o flood prone areas are restricted from development under existing location standards. These areas include the 100-year flood plain, channel encroachment and wetland areas.

The U.S. EPA has established a number of factors to consider in evaluating these siting considerations. These are outlined in detail in the Guidance Document (U.S. EPA, 1985).

A 1.3 Ability to Monitor the Location

The site must be amenable to monitoring under existing monitoring requirements for hazardous waste treatment and disposal facilities. The primary consideration is for defining and establishing a hydrogeologic monitoring system. Some situations that may require special attention include:

- o areas that are located above water-table mounds;
- o areas above aquifers where ground water flow directions change seasonally or due to tides; and
- o locations in proximity to other waste management or potentially polluting industries.

Again, the U.S. EPA has established guidance for setting up a groundwater monitoring program. This information is available in "Criteria for Identifying Areas of Vulnerable Hydrogeology Under RCRA" (U.S. EPA, 1986)

A 1.4 Protected Lands Criteria

Protected lands include the following:

- o archaeological and historic places;
- o endangered and threatened species habitat;
- o national parklands;

- o wetlands;
- o wilderness areas;
- o wildlife refuges;
- o coastal areas; and
- o significant agricultural areas.

Facilities are generally restricted, under existing federal and state legislation, from development in designated protected lands.

A 1.5 Vulnerable Hydrology

The U.S.EPA developed "guidance criteria" to identify areas of vulnerable hydrogeology (U.S. EPA, 1986). As these criteria are applied, regulations may be developed to restrict development of hazardous waste storage and treatment facilities in vulnerable settings above Class I and II ground water. Class I ground water is an "irreplaceable source of drinking water" or an "ecologically vital" source of water. Class II ground water is defined as currently used or potentially available sources of water. Class III ground water is defined as saline or contaminated ground water which is unsuitable for consumption and is hydrogeologically isolated.

As indicated, the U.S. EPA is in the process of setting minimum siting criteria. These criteria are currently being reviewed and are expected to be promulgated by the fall of 1989.

A 2.0 State of Texas

In Texas, the responsibility for siting of landfills and hazardous waste treatment and disposal facilities rests with the Texas Water Commission. The Commission has established criteria for the siting of industrial waste landfills and regulations for the siting of hazardous waste storage and treatment facilities (pers comm Mr. R. Anderson). In general, the objectives of these criteria are to protect the environment and local communities, with an emphasis on ground- and surface water pollution due to inadequate waste containment.

A 2.1 General Siting Criteria for Landfills

The general siting criteria for industrial solid waste landfills are presented in a guidance document to proponents and outline the technical criteria to be used in the siting process (Texas Water Commission, 1983). Siting criteria are summarized below:

Separation: the facility should be located to allow for adequate separation from surrounding land use for the following reasons; safety, sufficient reaction time, adequate space for containment nuisance conditions and adequate monitoring distance. Separation distances are established on a project by project basis.

Areas of Concern: The following are identified as areas of concern in which a landfill will not be allowed without special safeguards:

- o 100-year floodplain;
- o wetland areas;
- o coastal high hazard areas;
- o low lying areas with high subsidence potential;
- o active fault zones;
- o aquifer recharge areas;
- o endangered species habitat areas;
- o designated parks and preserves;
- o incompatible zoning; and
- o areas of historic or archaeological potential.

In addition, proponents are advised to consult the land resources map prepared for the state. This map outlines the relative suitability of regions for waste facility siting.

A 2.2 Technical Siting Criteria

Soils: the facility should be sited where a natural secondary barrier to contain wastes is present. The primary considerations are outlined below:

- o nearly impermeable strata (recommend a hydraulic conductivity $< 1 * 10^{-7}$ cm/sec);
- o lack of stratigraphic complexity; and
- o high attenuation capacity.

Groundwater: the facility should be sited in areas which have acceptable groundwater conditions. Primary groundwater conditions which should be addressed are summarized below:

- o depth to aquifer (the greater the better);
- o groundwater velocity ($v < 10$ ft./yr);
- o flow path (as great as possible); and
- o groundwater quality (poor quality is preferred).

Active Geologic Processes: facility siting should consider the following geologic processes;

- o erosion;
- o shoreline erosion;
- o subsidence; and
- o faults (not within 61m of a Holocene fault).

Surface Water: the following surface water considerations should be included in site evaluation:

- o rainfall (favours net evaporation loss areas);
- o floodplains (avoid 100-year floodplain);
- o coastal wetlands; and
- o coastal high hazard areas (includes storm areas).

A 2.3 Other Siting Issues

Other siting issues include socioeconomic and environmental considerations.

Surrounding Land Use And Transportation: the following land use items should be addressed to minimize potential conflict with existing uses and to minimize potential public health and environmental issues. It is recommended that the following components be mapped:

- o zoning;
- o surrounding land use;
- o proximity to residences and public facilities;
- o proximity to local emergency response facilities;
- o growth trends of local communities;
- o proximity to waste generators;
- o location of pipelines and services;
- o access;
- o transportation routes and designations; and
- o underground storage facilities.

Other important siting issues that warrant consideration include:

- o critical wildlife habitat;
- o local jurisdiction; and
- o public participation.

A 2.4 Siting Regulations

The State of Texas has established regulations pursuant to the Texas Water Code which define location standards for hazardous waste storage, processing and disposal facilities. These standards are enforced by the Texas Water Commission as minimum standards for the siting of facilities (State of Texas, 1986).

Unsuitable site characteristics are generally similar to those previously outlined for landfills. Hazardous waste storage, treatment and disposal facilities would not be allowed in the following areas:

- o 100-year floodplains;
- o wetlands; and

- o recharge zone of a sole sourced aquifer.

In addition, development would not be allowed over a regional aquifer unless there was a minimum of 10 feet of material with a hydraulic conductivity not greater than 10^{-7} cm/sec (or equivalent) or secondary containment. Secondary containment would be required where soils within five feet of a containment structure had a hydraulic conductivity greater than 10^{-5} cm/sec.

A 3.0 State of New Jersey

The State of New Jersey has a legislated "Hazardous Waste Facilities Siting Act" (N.J.S.A. 52:14B-1 et seq) which establishes the criteria for the siting of major commercial hazardous waste facilities. The primary objective of the act is to set minimum location standards which will prevent any significant threat to human health or the environment (New Jersey Hazardous Waste Facilities Siting Commission, 1985, 1986). The broad objectives of the criteria are outlined below:

- o protect the residents of the state;
- o ensure structural stability of facility;
- o protect surface water;
- o protect ground water;
- o provide for safe transportation;
- o protect environmentally sensitive areas; and
- o protect air quality.

A 3.1 Human Health Criteria

The legislated human health criteria are summarized below:

- o the facility must be a minimum of 2000 ft. from any occupied structure for impoundment type facilities;

- o the facility must be a minimum of 0.5 mile from any occupied structure for non-impoundment type facilities;

- o the facility cannot be sited within a 20 mile radius of a nuclear fission plant;

- o no unreasonable risk of harm to health, safety or welfare of the population should result from the facility. The following should be considered:

    - the density of the population;
    - the size and type of facility;
    - the type of waste expected;
    - transportation and evacuation routes;
    - facilities in adjacent areas; and
    - availability of emergency services.

A 3.2 Structural Stability Criteria

Structural stability criteria are summarized below:

- o the facility must not be located within a 100-year floodplain;
- o the facility must not be sited within:
  - a coastal flood hazard area;
  - areas underlain by cavernous limestone; and
  - areas overlying past or present mining activities.

A 3.3 Protection of Surface Water Criteria

To protect surface water resources, no major, commercial hazardous waste management facility must be sited within:

- o the upstream portion of a water shed draining into an on-stream reservoir;
- o those watershed areas that drain directly into an off-stream reservoir; or
- o watersheds for waters classified as trout production waters.

A 3.4 Protection Of Environmentally Sensitive Areas Criteria

In order to protect significant or environmentally sensitive areas no major commercial hazardous waste management facility shall be sited within or on the following:

- o wetland areas;
- o sensitive habitat areas, unless means are taken to preserve similar habitat either on, or adjacent to the site;
- o designated wild, scenic, or recreational rivers;
- o municipally approved farmland preservation areas;
- o the Pinelands area; or

- o within 6.25 miles of any federal class 1 "Preservation of Significant Deterioration of Air Quality" area.

A 3.5 Safe Transportation Criteria

The following criteria are required to minimize potential risks due to the transport of hazardous waste to a facility:

- o transport is only recommended on highways or other suitably constructed roads;
- o the site be serviced by a direct access road from the highway; and
- o all transport must be within weight restrictions.

A 3.6 Protection Of Groundwater Criteria

The following criteria are legislated to protect groundwater resources:

- o the site must be located where the flow of groundwater in the uppermost saturated unit is parallel to or upwards toward the water table and the predominate flow direction is not toward a water body or aquifer used for consumption, and there is no significant recharge to deep aquifers;
- o facilities are prohibited where the depth of the seasonally high water table rises to within 1 foot of the ground surface;
- o impoundments are prohibited in areas where the groundwater travel time in the uppermost saturated unit from the outermost edge of the contaminant structure to the site boundary or surface water body or wetland is less than 10 years;
- o impoundments are prohibited within 1 mile of a well or wells producing 100,000 gallons per day (unless engineering controls are implemented); and
- o partially in-ground structures are prohibited in areas where the seasonally high groundwater table rises to within 5 feet of the containment structure;

A 3.7 Protection Of Air Quality Criteria

The following criteria have been established to protect air quality in the vicinity of hazardous waste management facilities. In addition, the criteria set total mass limits for selected groups of compounds.

- o commercial facilities are not allowed in "Air Quality Nonattainment Areas" unless additional emission control measures are implemented. Development in these areas would also be subject to the following more stringent emission restrictions;
  - the annual significant emission increase for volatile organic substances is 10 tons per year; and
  - the annual significant emission increase for total suspended particulates is 25 tons per year.

A 3.8 New Jersey Siting Experience

The New Jersey Hazardous Waste Facility Siting Commission has undertaken a State-wide search for potential sites using the selection criteria defined in the Act. The goal of the siting process is to select sites based on their technical merits, rather than reacting to social or political pressure (Gimello, 1988). The Commission is conducting its activities in an open public forum and has established a proactive public participation program.

The site selection process began in 1981 with the development of the siting criteria and related regulations. In 1986, eleven candidate sites were announced as having potential for further detailed site investigation. All sites were opposed and the Commission has spent more than 10 months in court defending their selection process. None of the legal challenges were successful. At present, several incineration sites are still being evaluated and the four sites proposed for land emplacement facilities have failed to meet the stringent site selection criteria (Gimello, 1988).

A 4.0 State of Minnesota

The State of Minnesota has recently initiated a siting process to identify candidate site(s) for a hazardous waste management facility. The siting approach adopted by the State (Waste Management Board) was different than that used in other jurisdictions. The Waste Management Board approached Counties to identify those with an interest in hosting a facility. Interested Counties were offered a financial benefits package to assist them in informing and educating citizens about the facility and the siting process. Each County participating in the program will then work closely with the WMB to find a location that offers maximum protection for the environment and public health (Minnesota Waste Management Board, 1987).

A 4.1 Mandatory Restrictions

The following criteria are mandatory under State statutes or Rules (Minnesota Waste Management Board, 1987). These criteria were presented to Counties as locational guidelines to assist them in identifying areas that may be suitable to undergo more detailed assessment.

- o the facility cannot be located in any place that can reasonably be expected to cause pollution of potable water;

- o the facility cannot be located where the topography, geology, hydrology or soil is unsuitable for the protection of groundwater. These areas include:

    - highly permeable surface materials;
    - shallow, unconfined or bedrock aquifers;
    - shallow Quaternary aquifers;
    - groundwater recharge areas;
    - seasonal high water tables;
    - steep and unstable slopes;
    - mappable peat deposits; and
    - surface and shallow underground mines.

- o the facility should not be located in areas characterized by karst features;

- o the facility may not be located in wetlands, shoreland or a 100-year floodplain;

- o the facility must not be located such that ambient air quality standards may be exceeded; and

- protected lands including historic sites, protected habitat, parks etc. should be avoided.

A 4.2 Additional Guidelines

The following locational guidelines are recommended for consideration in facility siting:

- the facility is an industrial development and should be located in an appropriate area, giving consideration to existing and proposed land use;
- the site should have reasonable access to major 2-lane or 4-lane, 9-ton highway, and;
- the facility should not be located in areas of known or threatened groundwater contamination.

These criteria are proposed to be used as general screening criteria to identify candidate areas only. A more detailed assessment of proposed areas would then be undertaken.

A 5.0 Summary, State Siting Criteria

As indicated, many States in the U.S. have developed site selection criteria for hazardous waste storage, treatment and disposal facilities in addition to the minimum siting regulations established by the U.S. EPA. Many of the criteria established under State control follow a common theme. The following tables summarize common siting criteria and identify the States which have adopted specific criteria (Temple, Barker & Sloane, Inc., 1987).

Table 1 outlines the criteria which are common between jurisdictions and summarizes the number of States which have adopted them. Tables 2 through 9 summarize State criteria for the following:

- o setback distances from environmentally sensitive areas;
- o States which prohibit or restrict location of facilities over aquifers or recharge zones;
- o setback distances from supply wells or water supplies;
- o setback distances to surface water bodies;
- o minimum depth to water table or aquifer;
- o standards for thickness of soil and hydraulic conductivity;
- o setback distances from property lines, and;
- o setback distances from residences, schools, churches or hospitals.

Individual States may have criteria in addition to these however, these criteria are representative of the primary technical criteria designed to minimize potential facility impact on the environment and public health.

Since 1972, thirty-six States have enacted hazardous waste siting statutes. Thirty-one of these have developed a formal siting process for hazardous waste facilities and ten States have formulated State hazardous waste management plans (Condron & Sipher, 1987).

A total of eighty-one applications for commercial hazardous waste treatment or disposal facilities in twenty-eight States have been submitted since State siting initiatives were enacted (1980). Of these, thirty-six are still in progress. Fourteen applications have been approved under RCRA however, only six of these have proceeded to become operational facilities. Based

on a review of State initiatives for siting hazardous waste treatment facilities, Condron and Sipher (1987) came to the following conclusions:

- State initiative in the siting process promotes siting activity;
- extensive public participation programs promote siting activity and certain elements of the public participation process appear to promote siting approval;
- neither strong State initiative or extensive public participation programs are essential to siting success;
- landfills and incinerators are harder to site successfully than treatment facilities; and
- siting success is influenced strongly by the individual circumstances surrounding each application.

The U.S. EPA has required all States to demonstrate their capabilities to manage hazardous wastes for a twenty year period pursuant to the Superfund Amendment and Reassessment Act (SARA) (Condron & Sipher, 1987). With this new directive, States will come under increasing pressure to site and develop hazardous waste treatment facilities.

Table 1

Common Location Criteria

Protecting Environmentally Sensitive Areas

Criteria	Number of States
Wetlands	23
Endangered Species Habitat	17
Parks, Preserves and Recreational Areas	16
Underground mining, Subsidence Areas	13

Protected Groundwater and Surface Water

Criteria	Number of States
Distance to Supply Wells & Water Supplies	20
Distance to Surface Water	20
Recharge Zones & Aquifers	18
Depth to Water Table or Aquifer	17
Hydraulic Conductivity &/or Soil Thickness	15
Soil or Rock Type	12
Karst Area	12

Ensuring Adequate Buffer Zone

Criteria	Number of States
Distance to Property Line	18
Distance to Residence	17

Note: includes proposed criteria for some States

Source: Temple, Barker & Sloane, Inc., 1987)

Table 2

Setback Distances From Environmentally Sensitive Areas

Area	Distance	State
Wetlands	1 mile	Nevada
	1,000 feet	New Hampshire
	0.25 miles	Oregon
	500 feet	Rhode Island
Endangered Habitat	1 mile	Nevada
Parks and Preserves	1 mile	Nevada
	1 mile	Oregon
Mining, Subsidence Areas	1 mile	Nevada
	200 feet	North Carolina
	1,000 feet	West Virginia

Note: Includes proposed criteria for some States.

Source: Temple, Barker & Sloane, Inc., 1987)

Table 3

States that Prohibit or Restrict Location of Facilities Over Recharge Zones or Aquifers

State	Location	Applicability
Alaska[1]	Sole source aquifer	All facilities
Arkansas	Recharge zones of sole source aquifer	All facilities
Delaware	Recharge areas Public water supply recharge areas	Land-based facilities Non land-based
Maine	Recharge zones and aquifers	Land-based facilities
Maryland	Aquifers	All facilities
Massachusetts	Groundwater drinking supplies	Land-based facilities
Michigan	Sole source aquifers and recharge zones	Land-based facilities
Missouri	Recharge zone	Land-based facilities
New Hampshire	Aquifer with yield of 72,000 g/d	All facilities
North Carolina	Recharge zone of sole source aquifer	Land-based facilities
North Dakota	Recharge area	All facilities
Rhode Island	Potential groundwater drinking sources	All facilities
Texas	Recharge zone of sole source aquifers	Land-based facilities
Washington	Recharge zone of sole source aquifer	Land-based facilities
West Virginia	Public water supply recharge areas	All facilities

[1]Note: regulations in this State are proposed.
[2]Applicability may mean landfills only in some cases.

Source: Temple, Barker & Sloane, Inc., 1987)

Table 4

Distance to Supply Wells or Water Supplies

State	Distance	Applicability
Alaska	500 metres	New and expanding land-based facilities
Arkansas	1000 feet	New land-based facilities
Delaware	0.25 miles	All land-based facilities
Idaho	1000 feet	All land-based facilities
Illinois	1000 feet	New land-based facilities
Maine	1000 feet	All new and expanding facilities
Massachusetts	1000 feet	New and expanding land-based facilities
Missouri	500 feet	All land-based facilities
Nevada	1 mile	All new facilities
New Hampshire	5000 feet	New land-based facilities
New Jersey	1 mile	New and expanding land-based facilities
Pennsylvania	0.5 mile	New land-based facilities
North Carolina	1000 feet	New land-based facilities
Rhode Island	500 feet	New and expanding land based facilities
Texas	500 feet	New land-based facilities
Washington	500 feet	All new and expanding facilities
Wisconsin	1200 feet	New and expanding land based facilities

Note: includes proposed regulations

Source: Temple, Barker & Sloane, Inc., 1987)

Table 5

Distances to Surface Water Bodies

State	Distance	Type of Surface Water Body
Alaska[1]	1500 metres	Surface water
Arkansas	500 feet	Surface water
Idaho[1]	2500 feet	Surface water
Minnesota	1000 feet 300 feet	Lake, pond, reservoir Stream
Nevada[1]	1 mile	Surface water
New Hampshire	1000 feet 1500 feet	Large pond, lake, reservoir Large river or stream
North Carolina	200 feet	Surface water
Oregon	0.25 mile	Surface water
Rhode Island	500 feet	Surface water
Washington	500 feet	Surface water
Wisconsin	1,000 feet 300 feet	Lake, pond River, stream

[1]Note: includes proposed criteria in these States

Source: Temple, Barker & Sloane, Inc., 1987)

Table 6

Depth to Water Table or Aquifer

State	Distance	Applicability[2]
Alaska	10 feet	All land-based facilities
Arkansas	150 feet	New land-based facilities
California	5 feet	All land-based facilities
Delaware	above	New land-based facilities
Idaho[1]	100 feet	New land-based facilities
Iowa[2]	100 feet	State owned facility
Kentucky	above	New land-based facilities
Maryland[2]	100 feet	New land-based facilities
Minnesota	above	All land-based facilities
Mississippi	20 feet	New land-based facilities
Missouri[2]	30 feet	All land-based facilities
Nevada[1]	150 feet	All new facilities
New Jersey	5 feet	New land-based facilities
North Carolina	10 feet	New land-based facilities
Oklahoma	15 feet	New land based facilities
Texas[2]	100 feet	New land-based facilities
Washington[2]	50 feet	New land-based facilities

[1]Includes proposed regulations in these States.
[2]Applicability may relate to landfills only in some cases.

Source: Temple, Barker & Sloane, Inc., 1987)

Table 7

Standards for Thickness of Soil and Hydraulic Conductivity

State	Thickness of Soil	Hydraulic Conductivity Limit (cm/sec)	Facility Applicability
California	Sufficient	$1 * 10^{-7}$	All land-based
Colorado	Sufficient	$1 * 10^{-7}$	New land-based
Idaho[1]	25 feet	-	New land-based
Maine	5 feet	$1 * 10^{-7}$	All new and expanding
Maryland	30 feet	-	New land-based
Michigan	6 metres	$1 * 10^{-6}$	All new and expanding
Mississippi	-	$1 * 10^{-7}$	New land-based
Missouri	30 feet	$1 * 10^{-7}$	All land-based
New Hampshire	Sufficient	$1 * 10^{-7}$	All new facilities
N. Carolina	20 feet	$1 * 10^{-7}$	New land-based
Oklahoma	10 feet	$1 * 10^{-7}$	New land-based
Texas	10 feet	$1 * 10^{-7}$	New and expanding land based

[1]Note: includes proposed regulations in this States

Source: Temple, Barker & Sloane, Inc., 1987)

Table 8

Setback Distances From Property Lines

State	Distance
Alaska[1]	500 metres
Arkansas	200 feet
Connecticut	400 feet
Idaho[1]	500 feet
Louisiana	200 feet
Maine	200 feet
Massachusetts	200 feet
Michigan	150 metres
Missouri	300 feet
New Hampshire	500 feet
North Carolina	200 feet
Oklahoma	200 feet
Oregon	1,000 feet
Texas	200 feet
Washington	200 feet
Wisconsin	200 feet

[1]Note: includes proposed criteria in these States

Source: Temple, Barker & Sloane, Inc., 1987)

Table 9

Setback Distances From Residences Schools, Churches, or Hospitals

State	Distance	Type of Structure
Delaware	1,500 feet 2,000 feet	Residence School, church
Idaho[1]	5,000 feet 3 miles	Residence School, church
Mississippi	1,000 feet 0.5 mile	Residence School, hospital
Nevada[1]	1 mile	Residence
New Hampshire	1,000 feet 3,000 feet	Residence School, hospital
New Jersey	2,000 feet	Residence
North Carolina	0.25 miles	School, church
Oregon	1 mile	Residence, school, church
Pennsylvania	1 mile	School, church, hospital
Texas	500 feet	Residence, school, church
Washington	2,000 feet 2,000 feet	Residence School, church, hospital

[1]Note: includes proposed criteria in these States

Source: Temple, Barker & Sloane, Inc., 1987)

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APPENDIX B

SITE SELECTION CRITERIA AND APPROACHES IN CANADA

The following sections outline the site selection process and siting considerations or criteria which have been applied in recent or ongoing hazardous waste facility development proposals in Canada.

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B 1.0 The Alberta Special Waste Management Corporation

The Alberta Special Waste Management Corporation (ASWMC) has successfully sited and developed a hazardous waste treatment and disposal facility at Swan Hills, Alberta. The siting process began in 1981 and included an extensive public participation program. A set of siting criteria were developed early on in the process to delineate lands which could be considered as candidate locations on a provincial basis. These criteria included physical, biological, land use and human constraints (McQuade-Cook & Simpson, 1986).

In 1981, all counties, municipal districts, improvement districts and special areas designated in the province were included in and received briefing sessions on the site selection process. General information on the types of criteria which may be used in the siting process were included. Following these initial information sessions, local authorities were given the option of participating further in the program. In order to proceed, local authorities were required to write a formal invitation to assess the suitability of siting a facility in their jurisdiction. Written submissions were received from 52 of a possible 70 jurisdictions. Studies were then undertaken in these jurisdictions by the government, at no cost to the municipality, and results were made available to the public. Twenty-five percent of the areas studied requested further consideration as a possible host community for the facility

Many areas were excluded on environmental grounds, while others were eliminated because of vocal public opposition. A total of five potential host communities underwent more detailed site selection processes which included site specific geotechnical investigations. All five areas held plebiscites to establish public support for the facility. Officially, two primary sites, Swan Hills and Riley, emerged from this process. Both sites were presented as acceptable alternatives by the Corporation and the final selection was made by a Cabinet decision.

The Alberta site selection process weighed heavily on public support to identify candidate regions. The technical criteria (constraints) used to identify candidate areas within interested municipalities included the following:

Physical Constraints

- areas with significant gravel or sand lenses, fractures, or groundwater were eliminated,
- all areas adjacent to surface water bodies or aquifers were eliminated,
- areas exhibiting steep or unstable slopes were not considered, and

- o seismic activity was reviewed and considered for candidate sites.

Biological Constraints

- o Areas exhibiting high potential for productivity were avoided. This included soil productivity for agriculture, forestry potential and important wildlife lands.

Land Use Constraints

- o the following land use areas were eliminated from consideration

  - prime farm land,
  - grazing reserves,
  - ecological reserves,and
  - all federally owned land

Human Constraints

- o areas exhibiting prehistoric, historic and cultural significance were eliminated, and

- o areas of intensive recreation were avoided.

These criteria were mapped on provincial base maps for public distribution. All information was made available to the public and candidate municipalities (those who requested formal consideration as host communities) were invited to select parcels in constraint free areas for further consideration. As indicated, detailed investigations were conducted on a total of five candidate sites prior to selection of the Swan Hills site (McQuade-Cook & Simpson, 1986).

B 2.0 British Columbia

British Columbia has recently embarked on the development of an integrated hazardous waste management facility for the province. A consortium of private companies (B.C. Special Waste Services Inc.) has been selected by the provincial Special Waste Advisory Committee (SWAC) to act as proponent for the project (pers. comm. Mr. T.W. Finnbogason, March, 1988). The site location will be selected by the proponent with input from (SWAC).

Preliminary site selection considerations have been developed by B.C. Special Waste Services Inc.. These siting considerations have been technically reviewed by SWAC as part of the proponent's proposal. Communities have been contacted to identify potential host regions. A detailed site selection process will be conducted within the host community selected for the project.

The following considerations will be addressed in the site selection process (pers. comm. Mr. T.W. Finnbogason):

Physical Site Characteristics:

- Topography
- Soil characteristics
- Surficial geology
- Aquifer characteristics
- Proximity to:
  - floodplains
  - holocene faults
  - areas subject to tsunamis
  - areas subject to slope failures
- Drainage (to wetlands)
- Seismic acceleration
- Water table
- Soil permeability
- Groundwater recharge capabilities
- Bedrock characteristics
- Proximity to water bodies
- Proximity to community water supplies
- Precipitation/evaporation

Land Features

- Availability of buffer zone
- Proximity to populated areas
- Current site land use
  - exclude parks
  - exclude wildlife areas
  - exclude ecological reserves
- Presence of non-renewable resources
- Land claims
- Capability for supporting waterfowl, ungulates
- Availability
- Cost
- Tax rates

Climate and Meteorology

- Precipitation
- Evaporation
- Temperature
- Air dispersion meteorology

Site Services

- Water
- Electricity
- Natural gas
- Effluent receiving streams
  - permitted sanitary wastes
  - permitted facility discharges

Community Infrastructure

- Transportation features
- Availability of emergency response services
- Ability to attract and hold labour force

Local Labour Force

- Size
- Skills
- Availability

Market Access

- Distance from waste generators
- Transportation
  - proximity to main routes
  - accident risk potential
  - environmental sensitivity of corridors
  - alternative transportation modes and routes

These considerations will be developed into a set of siting criteria for facility development which are consistent with the requirements of the new Special Waste Regulation (B.C. Reg.63/88, April 1, 1988).

The following minimum siting standards have been established under the Special Waste Regulation for all special waste management facilities; facility development will not be permitted in the following areas:

- a 100-year flood plain;
- within 100 m of a holocene fault;
- areas subject to tsunamis;
- within 100 m of land subject to slope failure;
- national, provincial, regional or municipal parks;
- wildlife management areas;
- ecological reserves;
- bird sanctuaries; and
- designated wildlife areas and critical wildlife habitat.

In addition, secure landfills, surface impoundments, waste piles, land treatment facilities and long term storage facilities have the following location restrictions:

- wetlands;
- seismic prone areas;
- recharge areas for unconfined aquifers;
- must be constructed totally above the seasonally high water table, and have a minimum depth of 3 m unsaturated soil material with a hydraulic conductivity less than $1*10^{-6}$ cm/s above a seasonally high water table;
- must have a minimum of 5 m of fine grained unconsolidated material with a hydraulic conductivity less than $1*10^{-6}$ cm/s over fractured or permeable bedrock formations;
- must not be within 300 m (secure landfills), 150 m (waste piles, surface impoundments and land treatment facilities) or 100 m (long term storage facilities) of any nonintermittent watercourse or any permanent waterbody;
- must not be within a designated community water supply watershed or in a

recharge area for an unconfined aquifer with one or more high capacity wells (>100 litres/minute);

- o precipitation rates must not exceed evaporation and transpiration rates; and
- o an approved secure buffer zone must be provided around the active area of secure landfills

The development schedule for the B.C. facility is very ambitious. The selection of candidate areas, determination of community interest, detailed community involvement program and preliminary site area evaluation steps are all scheduled to be completed within two months. The key element in this process is the selection of a host community. A number of communities have expressed an interest in the project and these are currently being evaluated by the proponent. The selected community must support the project in order for the proponent to proceed to the permitting stage (pers. comm. T.W. Finnbogason)

The proponent will submit a project development proposal to the Minister and commence permitting activities and detailed site investigations following selection of a host community.

B 3.0 The Ontario Waste Management Corporation

The Ontario Waste Management Corporation (OWMC) has undertaken an extensive site selection process within Southern Ontario. The process included a number of site selection phases, each one concentrating on a smaller area and introducing more detailed selection criteria.(OWMC, 1988)

The initial phase identified areas within Southern Ontario where the geological and hydrogeological conditions were suitable for further consideration for facility development. Interest quickly focused on the Golden Horseshoe region since this region produces the major portion of the province's wastes. Phase 2 identified two areas within the Golden Horseshoe region where the detailed search for candidate regions should concentrate. More detailed criteria were then developed to meet the following site selection objectives. Candidate areas should:

- o provide a second natural level of protection of the environment beyond that provided by engineering design,
- o identify areas which have a good probability of satisfying the site requirements subject to further detailed examination, and
- o there must be assurance in the process that no significant alternatives are being excluded (OWMC, 1984).

Phase 3 of the site selection process was the selection of candidate sites. These were selected with the following goals in mind (OWMC, 1984):

- o minimize risk to human health,
- o minimize environmental impacts, and
- o minimize financial costs to OWMC.

The site selection process was conducted using the "constraint mapping" approach. The following factors were considered unsuitable for facility development when considering all facility components (OWMC, 1984):

Physical Resources

- o surficial granular soils
- o significant stream resources

- flood plain areas
- wetlands
- drumlins
- morainal features

Land Use

- Indian reserves
- residential, built-up
- residential, designated and serviced
- commercial, designated and built-upon
- commercial, designated and vacant
- existing rural residential

Recreation and Community Facilities

- hospitals
- homes for the aged
- colleges and universities
- nursing homes
- special educational facilities
- police headquarters
- theme parks
- regional shopping centres
- correctional facilities
- institutions for the handicapped

Transportation

- airports

Agriculture

- existing speciality crops
- class 1 and 2 row crops and corn wheat
- class 1 and 2 mixed, cereal grain and hay grain
- class 3 row crops and corn wheat
- class 3 mixed, cereal grain and hay grain

- o class 1 and 2 hay and grazing
- o class 4 row crops and corn wheat
- o class 4 mixed, cereal grain and hay grain

Following completion of this screening exercise, the relative suitability of candidate sites was evaluated using "comparative evaluation factors" which included human, physical and biological environment, and economic factors. A short list of potential sites was generated in this process for further detailed investigation.

B 4.0 Siting Criteria; Manitoba CEC Hearings

The Manitoba Clean Environment Commission (CEC) has held a series of hearings soliciting public involvement and comment on issues related to hazardous waste management in the province.. The most recent set of hearings, conducted from November 12, 1986 to January 20, 1987, addressed the issues of facility development options and facility siting. Based on submissions presented at these hearings, the CEC has made several recommendations related to the development of siting criteria and public involvement in the site selection process (CEC, May 1987).

B 4.1 Hearing Submissions

Hearings were held at eleven regional centres throughout the province. A number of formal submissions were received by the Commission and public attendance at the hearings was estimated at approximately 450 individuals.

Concerns and recommendations received by the CEC on the siting of a hazardous waste management facility are summarized below:

- the facility should be located on an impervious clay base,
- the following topographical and land use characteristics should be avoided:
  - wetland areas,
  - prime agricultural land,
  - steeply rolling terrain,
  - areas subject to erosion and slumping,
  - areas with fractures leading to groundwater aquifers,
  - biologically sensitive areas,
  - archaeological and historic sites,
  - areas of high population density, and
  - areas with resource development potential.
- the facility should not be located in groundwater recharge areas or areas with seasonal high groundwater tables,
- areas of high natural hazard risk (i.e. tornadoes, floods) should be avoided,

- the facility should have local public support,
- local wind patterns and facility location with respect to local population centres should be considered,
- the facility should be located on Crown land or on a sufficiently large tract of land to permit establishment of an adequate buffer zone,
- there must be provision for the on-site disposal of detoxified effluent from treatment processes (eg. evaporation pond, deep well disposal or disposal to surface water),
- the facility should be located close to waste generators to minimize transportation risks,
- site services and road access must be available and rail access would be an advantage, and
- a community must be within reasonable commuting distance to provide services for the facility work force.

These siting considerations and concerns represent a wide range of interests. The above summary represents viewpoints expressed by the general public, local governments, industrial and commercial interests

B 4.2 Commission Recommendations

The following recommendations were made by the CEC following review of submissions and public discussion related to the issue of facility siting:

- the Crown Corporation should utilize information presented at these public hearings and criteria developed in other jurisdictions (Alberta and Ontario) to assist in the preparation of comprehensive and detailed site selection criteria,
- acceptance of the Crown Corporation's criteria should be obtained through the public hearing process,
- hydrogeological qualification of a site is the most important technical and engineering consideration whereas, public acceptability is the most important socio-economic consideration, and

- the site should located within reasonable distance of Winnipeg, where a major portion of the wastes are generated, to limit transportation risks and cost.

In summary, the CEC felt it was essential to involve the public in the site selection process, particularly in the development of siting criteria. With respect to technical issues, the CEC felt hydrogeological concern should be given priority and a location close to waste generators would be preferred.

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